

Q 1 : A car accelerates from rest to speed of 8 m/s over a distance of 16 m.

What is the acceleration of the car?

- a) -10 m/s^2 **b) 2 m/s^2** c) 0.5 m/s^2 d) -2 m/s^2 e) no acceleration , $v = 8 \text{ m/s}$

$$v^2 = v_o^2 + 2a\Delta x$$

$$8^2 = 0^2 + 2a(16)$$

$$64 = 32a$$

$$a = \frac{64}{32} = 2 \text{ m/s}^2$$

Q2 : A stone thrown from the top of a building 50 m high is given an initial velocity of 29 m/s straight upward. The speed when the stone at the maximum height is :

- a) 79 m/s b) 59 m/s c) 99 m/s d) 49 m/s **e) 0 m/s**

عند أعلى ارتفاع يوقف الجسم وتكون سرعته صفر

Q3 : A body moving along straight line at 20 m/s deceleration at 4 m/s^2 .

After 2 second its speed will be equal to

- a) 12 m/s** b) 1.8 m/s c) 16 m/s d) -12 m/s e) 20 m/s

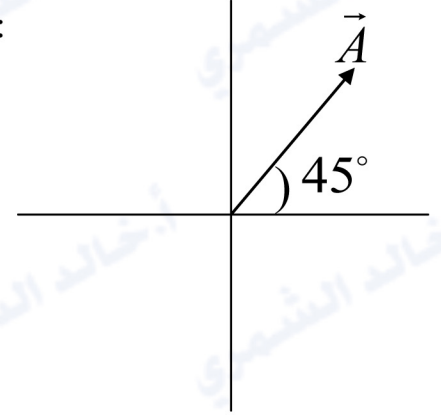
$$v = v_o + at$$

$$v = 20 + (-4)(2)$$

$$v = 20 - 8 = 12 \text{ m/s}$$

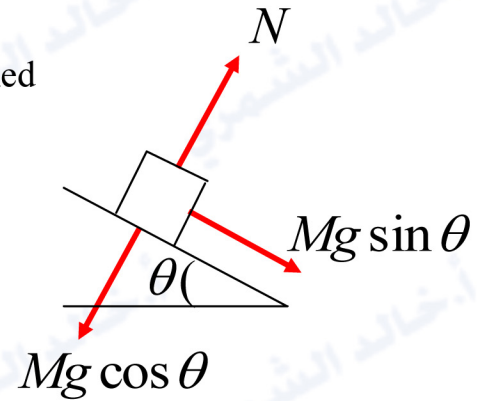
Q4 : In the figure shown, if $A = 2$, the components of $-A$ are :

- a) $-\sqrt{2}, \sqrt{2}$ b) $\sqrt{3}, \sqrt{2}$ c) $-\sqrt{2}, -\sqrt{2}$
 d) $2, \sqrt{3}$ e) None of these



$-\sqrt{2}, -\sqrt{2}$ هي الإجابة هي A- يقع في الربع الثالث . المركبة السينية والصادية بالسالب ، إذاً الإجابة هي

Q5 : A block of mass M slides down a frictionless plane inclined at an angle θ with the horizontal. The normal reaction force exerted by the plane on the block is :



- a) $Mg \cos \theta$ b) $Mg \sin \theta$ c) Mg d) zero, since the plane frictionless

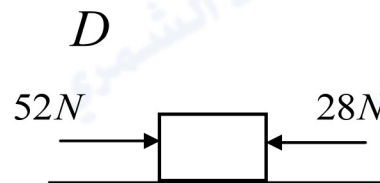
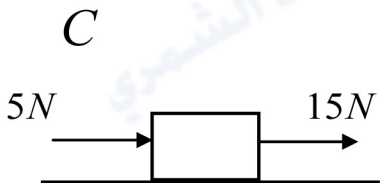
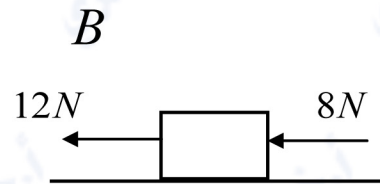
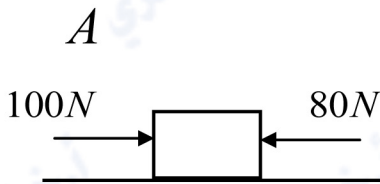
Q6 : Which of the following systems will produce maximum acceleration?

a) A

b) B

c) C

d) D



الأكبر محصلة قوى هو الأكبر تسارع . A,B,C محصلتهم 20 N و D محصلة القوى 24 N

Q7 : A rock is thrown straight up with an initial velocity of 15 m/s. Ignore energy lost to air friction. How high will the rock rise?

- a) 3.4 m b) 6.5 m **c) 11.5 m** d) 22.9 m e) 56.9 m

$$v = \sqrt{v_o^2 + 2g(h_o - h)}$$

$$0 = \sqrt{(15)^2 + 2g(0 - h)}$$

$$0 = (15)^2 - 2gh$$

$$2gh = (15)^2$$

$$h = \frac{(15)^2}{2g} = 11.5m$$

Q8 : An object does free fall. The following figure shows this motion.

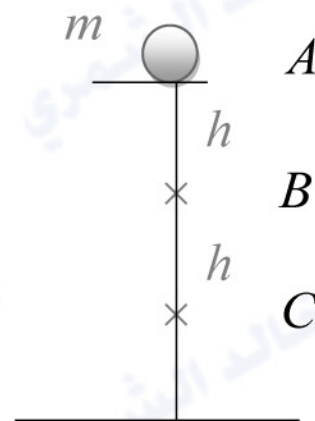
What is the ratio of kinetic energy at C to total mechanical energy of the object?

- a) 1/3** b) 2/3 c) 3/2 d) 1/2 e) 1/4

$$v_c^2 = v_o^2 + 2g(h_o - h_c)$$

$$v_c^2 = 2g(3h - h)$$

$$v_c^2 = 4gh$$



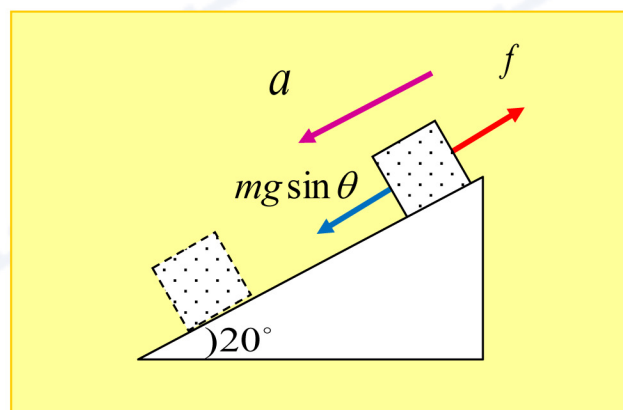
$$\frac{K_c}{E_o} = \frac{K_c}{K_o + U_o} = \frac{\frac{1}{2}mv_c^2}{mgh_o} = \frac{\frac{1}{2}m[4gh]}{mg(3h)} = \frac{2mgh}{3mgh} = \frac{2}{3}$$

Q9 : A cart is released at the top of an inclined plane that is elevated 20.0° from the horizontal. The cart has a mass of 1.12 kg and reaches a velocity 1.2 m/s after 3.0 second. What is the coefficient of kinetic friction between the incline and the block?

- a) 0.42 b) 0.5 c) 0.23 **d) 0.32** e) 0.89

$$v = v_0 + at$$

$$a = \frac{v - v_0}{t} = \frac{1.2 - 0}{3} = 0.4 \text{ m/s}^2$$



$$\Sigma F = ma$$

$$mg \sin \theta - f = ma$$

$$mg \sin 20 - \mu mg \cos 20 = ma$$

$$(1.12)(9.8) \sin 20 - \mu(1.12)(9.8) \cos 20 = (1.12)(0.4)$$

$$3.75 - 10.3\mu = 0.448$$

$$\mu = \frac{3.75 - 0.448}{10.3} = 0.32$$

Q10: A 70 kg man runs a vertical stairs of 6 m high in 2 s.

The average power exerted by the man in Watt is :

- a) 8232 b) 4116 **c) 2058** d) 229 e) 210

$$P = \frac{W}{t} = \frac{mgh}{t} = \frac{(70)(9.8)(6)}{2} = 2058W$$